AMENDMENTS TO THE CLAIMS

1. (Currently Amended) An exhaust gas purifying system for an internal combustion engine, comprising:

an exhaust-after-treatment device disposed in an exhaust system of the internal combustion engine, and including a particulate filter configured to collect particulates from exhaust gas, and an NO_2 generating unit upstream of or in the particulate filter;

a discharged particulate amount calculating unit configured to obtain ~~calculate~~ an amount of discharged particulates from a map on the basis of an excess air ratio;

a burnt particulate amount calculating unit configured to calculate an amount of burnt particulates on the basis of a temperature of exhaust gas in front of the particulate filter or a temperature of the particulate filter; and

a particulate accumulation amount calculating unit configured to calculate an amount of accumulated particulates on the basis of the calculated amount of discharged particulates and the calculated amount of burnt particulates.

2. (Original) An exhaust gas purifying system for an internal combustion engine, comprising:

an exhaust-after-treatment device disposed in an exhaust system of the internal combustion engine, and including a particulate filter configured to collect particulates from exhaust gas, and an NO_2 generating unit upstream of or in the particulate filter;

an excess air ratio frequency calculating unit configured to calculate an excess air ratio frequency at which an excess air ratio is equal to or less than a predetermined value during the operation of the internal combustion engine;

a discharged particulate amount calculating unit configured to calculate an amount of discharged particulates on the basis of an excess air ratio frequency at which an excess air ratio is equal or less than a predetermined excess air ratio;

a filter temperature frequency calculating unit configured to calculate a filter temperature frequency at which the temperature of exhaust gas in front of the particulate filter or the temperature of the particulate filter is equal to higher than a predetermined value;

a burnt particulate amount calculating unit configured to calculate an amount of burnt particulates on the basis of the filter temperature frequency; and

a particulate accumulation amount calculating unit configured to calculate an amount of particulates on the particulate filter on the basis of the calculated amount of discharged particulates and the calculated amount of burnt particulates.

3. (Original) The exhaust gas purifying system of claim 2, wherein: the discharged particulate amount calculating unit calculates an amount of particulates discharged in a given time period during which the excess air ratio is equal to or less than the predetermined value; the burnt particulate amount calculating unit includes a burning velocity calculating section which calculates a velocity for burning particulates on the particulate filter on the basis of the filter temperature frequency, and derives an amount of particulates burnt in the given time period on the basis of the particulate burning velocity in the given time period and the amount of particulates accumulated in the given time period; and the particulate accumulation amount calculating unit calculates an amount of currently accumulated particulates on the basis of the amount of previously accumulated particulates, the amount of particulates discharged during the given time period, and the amount of particulates burnt in the given time period.

4. (Previously Presented) The exhaust gas purifying system of claim 2, wherein the calculation of the amount of discharged particulates includes: downloading data on an amount of intake air and data on an amount of injected fuel: calculating an excess air ratio λ in a given time period Δt on the basis of the amount of intake air and the amount of injected fuel; calculating an excess air ratio frequency $\gamma\Delta t$, in which the excess air ratio λ is equal to or less than the predetermined value in the given time period Δt, and calculating the amount of discharged particulates $Me\Delta t$ $\{= f\lambda\Delta t\}$, the foregoing procedures being conducted in the named order.

5. (Original) The exhaust gas purifying system of claim 2, wherein the calculation of the amount of burnt particulates includes: downloading the catalyst temperature gt; calculating a filter temperature frequency $\beta\Delta t$ in the given time period Δt on the basis of the catalyst temperature gt; correcting the filter temperature frequency $\beta\Delta t$ using a correction factor K which depends upon an index NOx/Soot representing that components of exhaust gas are suitable for burning particulates; calculating a particulate burning velocity coefficient $\alpha\Delta t$ {=f ($\beta\Delta t$)} for the given time period Δt; and calculating an amount $Mb\Delta t$ $\{\alpha\Delta t \times PM_{i-1}\}$ of burnt particulates on the basis of an amount PM_{i-1} of previously accumulated particulates and the particulate burning velocity coefficient $\alpha\Delta t$, the foregoing procedures being conducted in the named order.

6. (Previously Presented) The exhaust gas purifying system of claim 1, wherein the burnt particulate amount calculating unit is configured to calculate the amount of burnt particulates on the basis of the temperature of exhaust gas in front of the particulate filter or the temperature of the particulate filter, and a fuel burning velocity coefficient.

7. (Previously Presented) The exhaust gas purifying system of claim 6, wherein the fuel burning velocity coefficient is obtained from a map based on the temperature of exhaust gas in front of the particulate filter or the temperature of the particulate filter.

8. (Previously Presented) The exhaust gas purifying system of claim 1, wherein the excess air ratio is calculated by a formula:

$$\lambda = Qa / (Qf \times 14.7)$$

where, λ is the excess air ratio, Qa is the intake air amount, and Qf is the fuel injection amount.